terior curves computed from Helmholtz's equations harmonize so happily with the exterior lines derived from this discussion on the output of the sun, that the probability is strengthened that this scheme is the proper one with which to enter upon the analysis of the internal circulation of the sun. As already noted in that bulletin, if the vortex law ($\omega\varpi^2 =$ constant, where $\varpi =$ the radius and $\omega =$ the angular velocity) holds good in this case, then we have an explanation of the cause of retardation of the diurnal angular velocity of the motions of the photosphere in middle latitudes as referred to the equatorial or polar belts. For if $\varpi_2 > \varpi_1$ then $\omega_2 < \omega_1$, and since ω_1 is the initial rotational velocity at the equator, the angular velocity in middle latitudes must be less than at the equator or at the poles. This agrees with the result of the surface observations. Furthermore, the equatorial angular velocity is probably that of the interior mass, or nucleus of the sun, and the poles should have the same velocity, a result in harmony with that deduced from my discussion of the terrestrial magnetic field. This equatorial and polar angular velocity gives a 26.68-day synodic period for the rotation of the sun. Finally, the middle latitudes must give a slower angular velocity and a greater period, such as 27.30 days in the belts 12° to 15°. Since the mass of the sun ought not by this theorem to have in any portion of it an angular velocity less than that of the equatorial plane, it does not appear to be reasonable that the short periods of about 25.80 to 26.00 days, which several investigators have announced as that of the sun's rotation derived from a discussion of several different terrestrial phenomena, can be correct. It is very difficult to perceive how there can be any basis for a period shorter than 26.68 days; on the contrary these authors seem to find a period at least one day shorter than the quickest period that can be derived from the observations and discussions of surface solar phenomena. It is very probable that the problem of the circulation within the sun must be worked out before we can hope to bring that of the rotation of the solar mass to a satisfactory understanding.

CLIMATOLOGY OF COSTA RICA.

Communicated by H. PITTIER, Director, Physical Geographic Institute.

[For tables see the last page of this REVIEW preceding the charts.]

Notes on the weather.—On the Pacific slope the weather was about normal, but for a slight excess of heat and the extreme dryness of the atmosphere, as can be seen from the observations at San José. On the Atlantic slope rain was generally scarce.

Notes on earthquakes.—January 1, $0^h\ 45^m$ a. m., protracted shaking E–W, intensity IV, duration 28 seconds. January 2, $1^h\ 49^m$ a. m., tremors. January 3, $5^h\ 32^m$ a. m., slight shock E–W, intensity II, duration 5 seconds. January 3, $10^h\ 39^m$ p. m., tremors. January 13, $8^h\ 12^m\ 46^s$ p. m., strong shock N–S, intensity III, duration 3 seconds.

HIGH WINDS IN MOUNTAIN VALLEYS.

By ALTON D. ELMER, Northfield, Mass., dated February 10, 1903.

I inclose a newspaper clipping relative to the storm of January 31, 1903, which may interest you, as it is illustrative of a phenomenon which is a part of every extra high wind from west or northwest in the Green Mountain passes. The pressure on the west side of the Appalachians seems to break through the cuts like water, with disastrous results to the towns in the valleys facing them. The towns at the mouths of the passes (Readsboro and Wilmington, Vt., being examples) of course suffer the most. I only send you one cutting, relating to a sample valley town, not in the mouth of a pass.

HIGH WIND AT ZOAR, MASS.

W. D. Rifenburg, who has charge of the wrecking crew, is authority for the following story: He says that when the west bound freight, 205, was passing through Zoar, Saturday, the wind struck an empty box car with tremendous force and lifted it bodily from the trucks and tipped it over on the east bound track. The portion of the car was jacked up, and again the wind struck and tipped it over. When the wreck was cleared the men waited in the station, when the wind struck it with such force that the men thought the station would blow down and left it. All the men say they never encountered such a terrific wind in their lives.

Reports from all such valley towns would fill a scrapbook. This phenomenon should not be compared with that of the easterly winds (see MONTHLY WEATHER REVIEW, 1897, Vol. XXV, pp. 212, 307; 1898, Vol. XXVI, p. 66), inasmuch as the east and southeast gales seem to attain their destructive force in the valleys at the leeward bases of mountain ranges.

CLIMATOLOGICAL DATA FOR JAMAICA.

Through the kindness of H. H. Cousins, chemist to the government of Jamaica and now in charge of the meteorological service of that island, we have received the following table in advance of the regular monthly weather report for Jamaica:

Comparative table of rainfall for January, 1903.

Divisions.	Relative area.	Number of stations.	Rainfall.	
			Average.	1903.
	Per cent.		*Inches.*	*Inches.*
Northeastern division	25	21	5.38	3.00
Northern division	22	47	3.38	1.99
West-central division	26	21	2.19	1.73
Southern division	27	32	1.70	1.03
	100	121	3.16	1.94

The rainfall for January was therefore much below the average for the whole island. The greatest rainfall, 8.82 inches, occurred at Port Antonio, in the northeastern division, while at Fort Hill in the southern division 0.05 of an inch fell.

Comparative table of rainfall for December, 1902.

Divisions.	Relative area.	Number of stations.	Rainfall.	
			Average.	1902.
	Per cent.		*Inches.*	*Inches.*
Northeastern division	25	21	9.91	14.82
Northern division	22	47	5.72	11.60
West-central division	26	21	3.78	4.07
Southern division	27	32	2.66	2.45
	100	121	5.52	8.23

The rainfall for the whole island was, therefore, considerably above the average. The heaviest fall recorded was, 47.94 inches, at Moore Town, in the northeastern division, while 0.32 of an inch fell at New Yarmouth in the southern division.

THE SOUTHERN LIMIT OF A NORTHWEST GALE.

By H. H. TENBROECK, of Braidentown, Fla.

On the morning of September 9, 1902, there was an instance of the meeting and arresting of a northwest gale in the neighborhood of Braidentown, Fla.

At sunrise there was a bank of very dark clouds in the northwest that rose slowly and showed the rolling overhanging mass that characterizes such clouds. The wind was fresh from the southeast, the sky was generally covered with very threatening, dense cumulus clouds. By 8 a. m. the bank in the northwest had risen about 15° or 20° with every indication of a squall of wind and rain immediately. But the bank began to grow lighter, the overhanging rolling mass disappeared and the whole broke up into a mass of ill-defined cumulus clouds, the wind increasing in force from the southeast and the clouds becoming more dense and threatening. By noon, however, the wind lessened in force, the clouds became thinner and more scattered, and the bank in the northwest entirely disappeared. Twice before I have noted the same phenomenon of a northwest gale reaching its limit.

Thinking that a note of this occurrence might add a grain of information about the very interesting matter of air currents, I send it to you.